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APPARATUS FOR PRODUCING GASEOUS FUEL.

APPLICATION FILED MAY 27, 1915.

1,167,021. Patented Jan. 4, 1916.

Fig. 1.

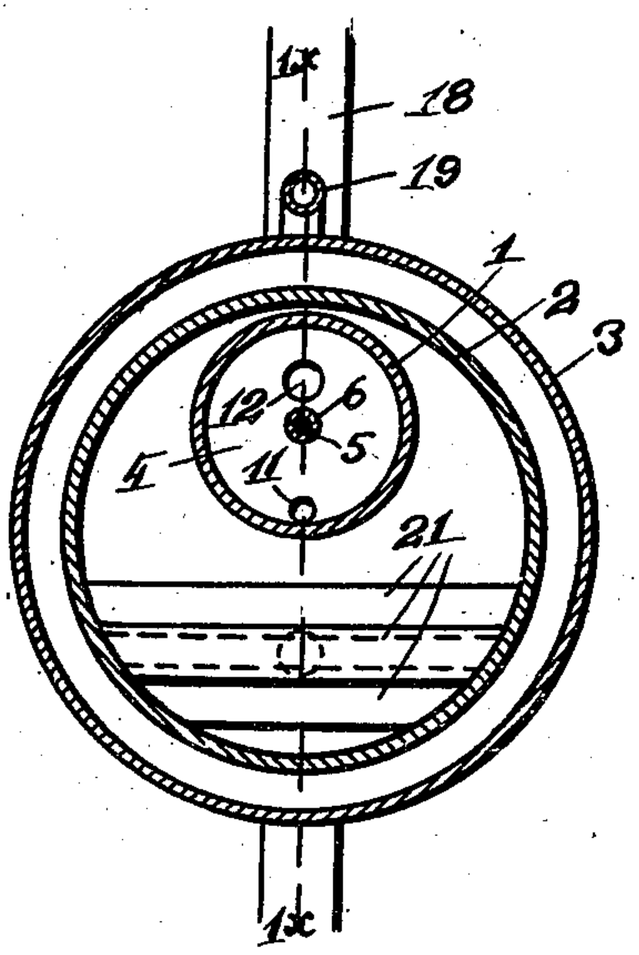

Fig. 2.

Witnesses
Eric Schinger.
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UNITED STATES PATENT OFFICE.

FRANCIS M. RITES, DECEASED, LATE OF ITHACA AND SLATERVILLE SPRINGS, NEW YORK, BY CHARLES H. GALLAGHER, EXECUTOR, OF ITHACA, NEW YORK, ASSIGNOR TO PERIE CLAPP RITES, GUARDIAN OF MARION B. RITES.

APPARATUS FOR PRODUCING GASEOUS FUEL.

1,167,021. Specification of Letters Patent. Patented Jan. 4, 1916.

Original application filed February 5, 1913, Serial No. 746,295. Divided and this application filed May 27, 1915. Serial No. 30,851.

To all whom it may concern:

Be it known that FRANCIS M. RITES, deceased, late a citizen of the United States residing at Ithaca and Slaterville Springs, in the county of Tompkins and State of New York, did invent certain new and useful Improvements in Apparatus for Producing Gaseous Fuel, (described in his previous application, Serial No. 746,295, filed February 5, 1913, of which this is a division,) of which the following is a specification.

The object of this invention is to provide an improved apparatus by which gaseous fuel may be produced from crude oil.

In the accompanying drawings, Figure 1 is a longitudinal section of the improved apparatus by which the process is worked, the section being taken on the line 1^x—1^x of Fig. 2. Fig. 2 is a vertical cross section on the line 2^x—2^x of Fig. 1.

In the accompanying drawings like reference numerals refer to like parts.

In the drawings 1 indicates the tube into which the crude oil is introduced for the purpose of ordinary and destructive distillation.

Reference numeral 2 indicates a tube surrounding the first tube for the purpose of heating the first tube.

Reference numeral 3 indicates a water tube which surrounds the tube 2, in the space between which tubes water is confined for the purpose of cooling the inner tube 2. In the tube 1 is placed a series of partitions 4, 4 etc., for a purpose that will presently be described. The rod 5 passes through these partitions, this rod being surrounded by the sleeves 6, 6 by which the division plates are spaced apart. These sleeves and division plates are all tied together by the rod 5 which has the nuts 7 and 8 on the ends thereof by which they are also held in place with reference to the cylinder heads 9 and 10 of the apparatus. Each of the division plates is pierced at the top and the bottom with the openings 11 and 12. The lower openings 11 permit and regulate the flow of crude oil through the tube 1, so that the oil is spaced somewhat uniformly throughout the length of the tube, and prevent circulation of the oil within the tube. The upper openings 12, 12 are to permit the escape of the gases and vapors as rapidly as they are formed.

The crude oil is introduced into the tube 1 by means of the tube 13. The residue is drained from the tube 1 by means of the tube 14 through which it is fed into the burner 15, which burner extends through the cylinder head 9 and into the tube 2. It is this residue that is drained to furnish the heat by which the process is carried on.

The space between the tubes 2 and 3 is filled with water for the purpose of cooling the tube 2. The product of distillation is carried from the tube 1 through the tube 16 and the producer gas which is produced inside of the tube 2 is carried off through the tube 17, both of these being combined and carried out through the tube 18. The steam that is formed in the water space from the heat of combustion is carried back through the tube 19 and discharged into the tube 2 at 20, where it is decomposed and partly consumed in connection with the product of combustion issuing from the tube 15 in the manufacture of producer gas. In the tube 2 are placed the baffle plates 21, 21, 21, by which a better application and utilization of the heat is secured.

The whole apparatus is slightly inclined toward the rear so that there will be a gravity flow of the crude oil from the front to the rear of the apparatus.

The process that is carried out by this apparatus may be described as follows: The crude oil is introduced through the tube 13 into the inner tube 1 and is subjected to the heat which is generated by the tube 15 inside of the tube 2. As it slowly flows back and downward the more volatile and the more easily distilled elements of the crude oil pass off through the tube 16. As the crude oil works its way farther along the tube 1 it is subjected to greater and greater heat, which causes a distillation of the heavier products or even the breaking or cranking up of the heavier products into vapors or permanent gases, so that by the time the crude oil has reached the rear end of the tube 1 only the tar and perhaps some of the heavier elements of the oil still remain. These in turn pass through the tube 14 into the tube 15 from which they are sprayed by a blast of compressed air and burned in order to furnish

the heat for the distillation that occurs in the tube 1. The tube 2 inside of which the combustion is confined, is cooled by the water jacket surrounding it, which in turn secures an unequal distribution of heat along the tube 1, causing the rear end of the tube to be considerably hotter than the front end of the tube. The steam which is generated from the water jacket passes off through the tube 19 and is discharged into the tube 2 at the rear end, where in connection with the partly consumed products of the combustion from the tube 15, it forms combustion gas by combining with them. In this way by the above apparatus, the process may be carried on continuously for the production of gaseous fuel.

I am aware that apparatus has heretofore been used for securing the separation of the various elements of crude oil, but such apparatus rapidly becomes foul by the deposit of the tarry and other heavy residues of the crude oil, so that it is more or less impractical to use them. This apparatus, however, is designed with a view of keeping itself clean and eliminating the residue by partially burning it.

I claim:

1. An apparatus for producing gaseous fuel from crude oil, consisting of an inclined tube, having a series of parallel partitions extending across it dividing it into chambers, said partitions each having an opening at the bottom to permit the oil to flow downwardly through the chambers, successively from one end of the tube to the other, an opening in the top of each partition to permit the product of distillation to flow upwardly through the chambers from one end of the tube to the other, and means for heating the apparatus and means for supplying crude oil thereto, a lower opening at the upper end of the tube for feeding oil and a higher opening at the same end for drawing off the gas.

2. An apparatus for producing gaseous fuel from crude oil, consisting of an inclined tube, having a series of parallel partitions extending across it dividing it into chambers, said partitions each having an opening at the bottom to permit the oil to flow downwardly through the chambers, successively from one end of the tube to the other, an opening in the top of each partition to permit the product of distillation to flow upwardly through the chambers from one end of the tube to the other, means for draining the residue from the tube and burning it under the tube to furnish the heat for vaporizing the oil.

3. An apparatus for producing gaseous fuel from crude oil, consisting of an inclined tube, having a series of parallel partitions extending across it dividing it into chambers, said partitions each having an opening at the bottom to permit the oil to flow downwardly through the chambers, successively from one end of the tube to the other, an opening in the top of each partition to permit the product of distillation to flow upwardly through the chambers from one end of the tube to the other, means for draining the residue from the tube and burning it under the tube to furnish the heat for vaporizing the oil, said tube being surrounded by a water jacketed cover capable of furnishing steam, means for conducting said steam to the burning means.

In testimony whereof, I affix my signature in presence of two witnesses.

CHARLES H. GALLAGHER,
Executor of the estate of Francis M. Rites, deceased.

Witnesses:
JOHN B. COLLINS,
EDWARD H. BUCK.